

CLAIMS

I claim the following:

1. Footwear for athletic activity, with storage of the energy of the down-step, and incorporating means for releasing substantial portion of said energy substantially at the moment of up-step, whereby providing substantial assistance to said athletic activity.
2. The footwear of Claim 1, with the two following characteristics in combination:
 - (a) compressible during the downward movement of a leg, and
 - (b) comprising elastic means for rebound, so constructed that said rebound substantially coincides with the subsequent upward movement of said leg, and that said rebound returns substantial fraction of the energy of the down-stepwhereby is facilitated the lifting of said leg away from ground, assisting leg movement during ambulation and athletic activity.
3. The footwear of Claim 1, so constructed that under pressure of an individual's feet, said footwear develops loaded harmonic motion at substantially the same frequency as said individual's repetitive up-and-down foot movements.
4. The footwear of Claim 1, designed, manufactured, adjusted, or selected with respect to a plurality of the following variables:

- a. type of said athletic activity,
- b. body weight of said individual,
- c. pressure exerted by said individual's said down-step,
- d. rate of movement of said individual's leg during said up-step,
- e. frequency per second of the up-and-down movements of said individual's legs

to maximize storage of the maximal amount possible of the energy of the down-step during each athletic activity of each of said individuals, and releasing said energy substantially at the moment of said up-step of each said individual, whereby facilitating and improving performance of a plurality of athletic activities for a plurality of individuals.

PCT/US2001/030309

5. A shoe or other footwear of Claim 1, containing compressible, elastic material, whether said elastic material is integral with and an intrinsic part of the bottom of said shoe or other footwear, or an insert inside said shoe or other footwear, or insert into the sole and/or heel of said shoe or other footwear, or an external attachment between the bottom of said shoe or other footwear and ground, where compression and subsequent expansion of said elastic material provide a particular period of oscillation for a given body weight, which period of oscillation can be selected for, or by, the footwear user, whether such selection is effectuated through substitution of one shoe or other footwear for another shoe or other footwear having a different period of oscillation, or through substitution of one insert for another with a different period of oscillation, or substitution of one external attachment by another external attachment with a different period of oscillation, or a combination of these three methods by themselves, or with any other method which modifies the period of oscillation of said shoe or other footwear, whereby that period of oscillation is selected which provides maximal assistance to said athletic performance.

6. Shoes with compressible, elastic sole and/or heel, manufactured or otherwise made available to a plurality of athletes, where

- (a) within each shoe size, said shoes are available in a range of different Hooke's spring constants of the sole/heel,
- (b) within each pair of said shoes, the spring constant of said sole and/or heel is equal between said left and right shoes,
- (c) within each size of said shoes, multiple pairs of shoes may be available, each of which having a spring constant of said sole/heel different from that of other pairs,
- (d) the spring constant of each pair of said shoes may be specified as part of a range of shoes of different spring constants, designated e.g. "Very Soft... Soft... Intermediate... Stiff....Very Stiff", or "100..200..300..400..500", or "100 lb... 125 lb.... 150 lb... 175 lb", or "walking.. jogging.. speed running.. jumping.. vaulting", or any other marking system, whether meaningful or arbitrary, for a series of shoes with differing elastic properties at the same shoe size,
- (e) the harmonic motion of said shoes, when loaded by said athlete's weight, may synchronize in frequency and/or phase, with such foot movements as said athlete requires for a particular athletic activity,
- (f) said shoe may be provided to each athlete out of said plurality of athletes as part of a series of similar shoes at each size, differing in spring constant such as to provide the same period of oscillation when worn by different members of said group of athletes, where each said member has a different body weight

whereby said footwear may provide maximal recovery of energy of stride for each athlete out of said plurality of athletes, regardless of shoe size, body weight, and type of sport engaged in.

7. A process of individualized selection and fitting of shoes with elastic sole/heel, including but not limited to the following steps:
 - (a) directly or indirectly determine an individual's body weight;
 - (b) directly or indirectly determine the athletic activity said individual desires to engage in;
 - (c) directly or indirectly determine said individual's shoe size;

and based on steps (a)-(c) above, regardless of the order said steps are executed:

directly or indirectly select a shoe of appropriate size and of such elastic properties, that while performing the specified athletic activity, said shoe will provide maximal assistance to said individual's foot movements required by said athletic activity

whereby facilitating said individual's said athletic activities and improving said individual's performance in said activities.,